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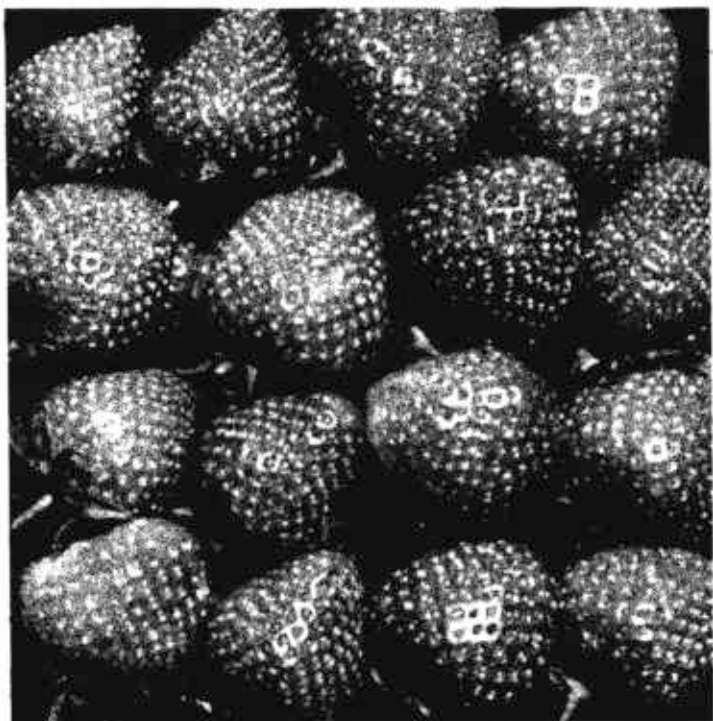
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STRAWBERRY VARIETIES IN THE UNITED STATES JUL 16 '79

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Revised June 1979

STRAWBERRY VARIETIES IN THE UNITED STATES

By D.H. Scott (*retired*), F.J. Lawrence, *SEA horticulturist*, and A.D. Draper, *SEA geneticist*¹

Strawberries are grown extensively for market and home use. The cultivated strawberry is an American fruit that originated by hybridization from the wild species of eastern North America and South America. The berries, which are rich in vitamin C, have a unique, tangy taste, and are highly valued as dessert fruit.

Commercially, strawberry growers today receive over \$200 million yearly for the freshly harvested fruit. About one-third of the crop is processed. This adds substantially to its overall value.

The 20 most important varieties, based on total tonnage of fruit marketed in 1976, listed in descending order are: Tioga, Hood, Tufts, Heidi, Midway, Guardian, Surecrop, Fresno, Blakemore, Sunrise, Redchief, Pocahantas, Tennessee Beauty, Catskill, Shuksan, Albritton, Dabreak, Sparkle, Raritan, and Florida Ninety.

Many other varieties are grown successfully. Some varieties with special qualities may be best for a given region. Other varieties are chosen for such particular qualities as flavor, shape, or hardness.

New varieties of strawberries appear from time to time (see page 25). These may grow well in one region, but prove unsatisfactory in other regions. Before planting new varieties extensively, growers should test them for more than one year. Compare new varieties with those already successful, and reject them if they are not superior to the standard varieties.

SELECTING A VARIETY

Grow the very best varieties for your region. Choose them carefully; many environmental conditions affect the performance of a given variety. New varieties become available frequently and the best variety last year may not be the best one this year.

The two general classes of strawberries are "everbearers" and "June-bearers" (one crop varieties). As their name suggests, everbearers produce fruit during spring, summer,

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and fall. June-bearers, on the other hand, produce fruit only in late spring and early summer.

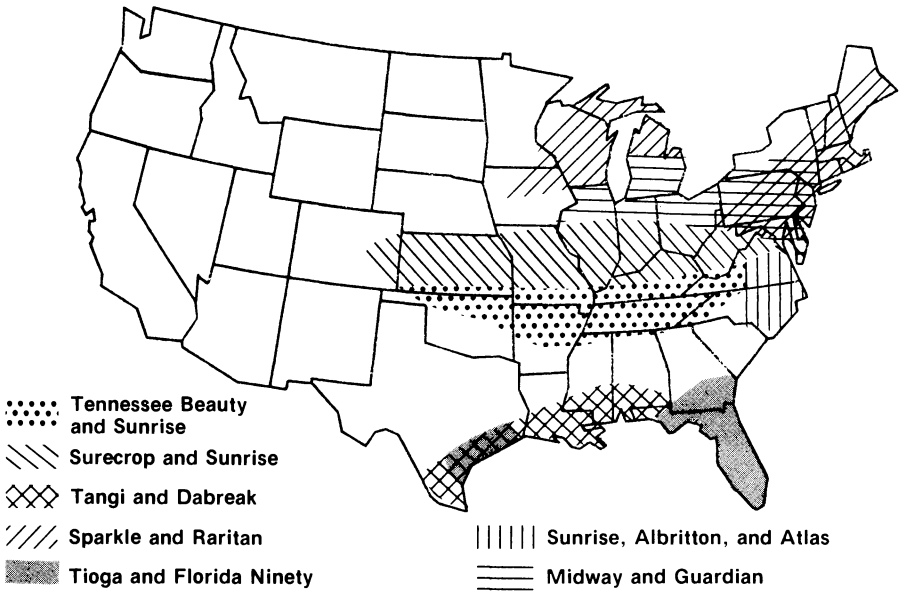
Whether the strawberries are grown in a home garden or for market influences the selection of a variety. In turn, the type of market use may determine the variety of strawberries grown. Strawberries are marketed fresh and frozen. They also are processed for preserves, flavoring, concentrates, and extracts.

REGIONAL DIFFERENCES

Regional adaptation refers to the response of a variety to environmental conditions within a region or

area. One major factor is the relationship between temperature and the amount of daylight on the growth and fruitbearing of plants.

Varieties of strawberries respond differently to these variable conditions. Differences appear in the growth, vigor, and productivity of plants; in the size, flavor, and firmness of fruit; and in susceptibility to diseases. Long days and warm temperatures favor the growth of leaves and runners. Short days and cool temperatures are necessary for flower formation in the June varieties. Everbearing varieties can produce flowers during either long or short periods of daylight.



Map shows the regions in which Tennessee Beauty, Sunrise, Surecrop, Tangi, Dabreak, Sparkle, Raritan, Tioga, Florida Ninety, Albritton, Atlas, Midway, and Guardian are grown profitable.

Southern Varieties

Varieties adapted in the Southern States need only short winter rest periods or none at all. They grow vigorously and form flower buds during the short days and mild temperatures of late fall, winter, and early spring. They are also able to withstand the high temperatures of summer. Most southern varieties are resistant to leaf spot and leaf scorch.

Of the southern varieties, Florida Ninety requires the least rest. Dabreak, Headliner, Albritton, Earlibelle, Tioga, Fresno, and Sequoia demand additional rest, while Blakemore and Pocahontas need the longest rest period.

Geographically, different varieties thrive in different areas. Tioga is the dominant variety in Florida and along the Gulf Coast. Dabreak and Headliner are the major varieties in Louisiana. Albritton and Earlibelle are foremost in eastern Virginia, eastern North Carolina, and southward along the Atlantic Coast.

Tennessee Beauty, Blakemore, and Pocahontas are the leading varieties over a wide arc that extends from southwestern Kentucky southward to within 100 miles of the Gulf Coast, then westward to eastern Oklahoma and Texas.

Generally, everbearing varieties perform poorly in the South.

Northern Varieties

Northern varieties have relatively long rest periods. They grow very little or very slowly during short days and cool temperatures. If you grow northern varieties in Florida,

they will blossom and produce fruit from 2 to 2-1/2 months later than Florida Ninety.

Northern plants can withstand cold winter temperatures that would severely damage the crowns and flower buds of southern varieties. Midway, Catskill, Surecrop, Guardian, and Sparkle are the varieties grown most extensively in the Northern States.

In the North, Gem and Ogallala are everbearing varieties favored for home gardens. Ogallala especially is well known for its winter hardiness. Sometimes it is able to survive temperatures of 40° F. Trumpeter is the most hardy of the northern varieties during winter. For this reason, it is the leading type in the plains States and the Upper Mississippi Valley.

Eastern and Western Varieties

In general, varieties that are adapted to the Eastern United States are not satisfactory in the Western United States and vice versa. To some extent, this is caused by differences in diseases. Viruses, for example, are more numerous and varied in the West than in the East. There are differences in the prevalence of foliage diseases as well.

Subtle differences in climate may also affect the performance of individual varieties. Hood, Tioga, Tufts, Heidi, Shuksan, and Totem are the major varieties in the Western United States.

West Coast varieties, especially Tioga, Tufts, and Hood, are produced in large quantities. Tioga and Tufts account for approximately 80

percent of California's strawberry production.

FACTORS AFFECTING GROWTH

Vigorous growth is essential to the production of large quantities of good berries. Consider such factors as soil fertility, temperature, and ripening season when considering plant growth.

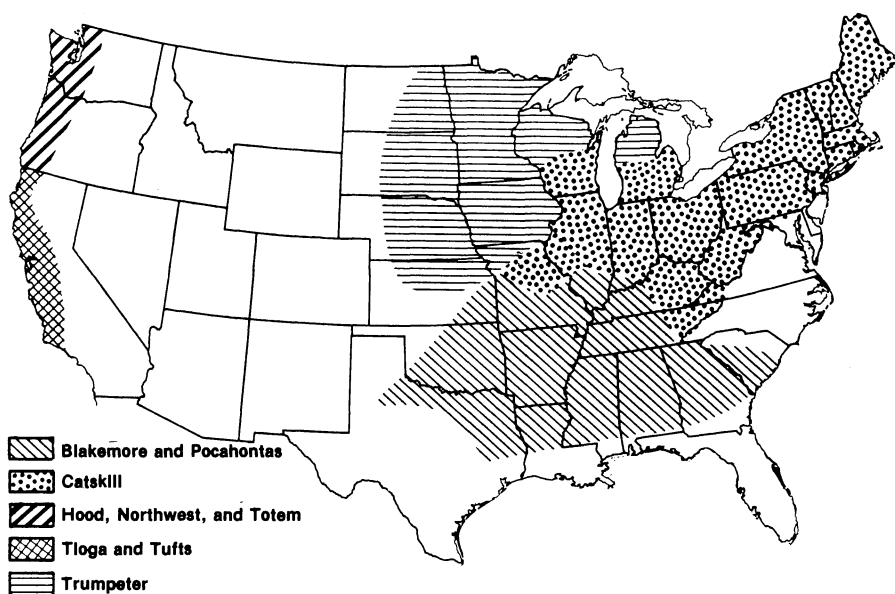
Soil Fertility and Moisture

Strawberry varieties respond differently to changes in soil composition and soil moisture. Where the soil is fertile and has ample moisture, varieties such as Blakemore and Surecrop may produce beds so dense that they develop few berries. How-

ever, when late runners are removed so that the remaining plants are spaced 4 to 6 inches apart, Blakemore and Surecrop plants can yield a large crop.

Blakemore, Pocahontas, Surecrop, and Catskill grow well in a wide range of soil types. Earlidawn, Raritan, Midland, and Redstar, on the other hand, require irrigation as well as fertile soil to produce enough runners and runner plants to make large yields possible.

Surecrop in the East and Totem in the West are well known for their resistance to drought. They produce crops under arid conditions better than other varieties do. Some Totem are grown at higher elevations than Hood and Northwest in Oregon and Washington. Hood and Northwest are grown in valleys where moisture is fairly uniform and irrigation is possible.



Map shows the regions in which Blakemore, Pocahontas, Catskill, Hood, Northwest, Totem, Tioga, Tufts, and Trumpeter are grown extensively.

Plant Development

Varieties differ greatly in growth habits and productivity. Some plants have certain characteristics that make them adaptable to a particular region. In the Eastern States, Surecrop, Midway, Catskill, and Guardian develop the best growth patterns. Normally they produce low, branching flower clusters. Should frost kill the first flowers, later blooms can still form large berries. In the South, Tangi and Florida Ninety have similar growth habits.

Some varieties, particularly in California, produce few berries per cluster, but they have many clusters per plant. The berries are large, and yields are high. Florida Ninety and Dabreak bear large fruit in the South, but produce small berries when grown in the North. Varieties that boast large, showy fruit are Albritton, Apollo, Atlas, Catskill, Fairfax, Florida Ninety, Guardian, Midland, Raritan, Sequoia, Tioga, and Tufts.

Blossom Fertility

Barring frost injury, the first flower of a cluster to open is the one most likely to form fruit. The last flowers to open are usually sterile. On most varieties, about one-third of the last blossom on each cluster may not form fruit. The flowers may appear to be normal, but they fail to develop or, at best, produce stunted, undeveloped fruit.

Besides frost damage, blossoms are threatened by rain, diseases, and insect pests. You can help combat blossom sterility by cultivating early

formed, well-spaced runner plants and by thinning them as they develop. These types produce fewer sterile flowers than late season, crowded ones.

Blossom Hardiness

Some varieties of strawberries are less vulnerable to frost injury than others. Short flower stems and flowers growing under protective leaves enable these varieties to escape frost damage. Other varieties produce flowers that are resistant, especially in the unopened bud stage, to a few degrees of frost. Earlidawn and Midway are two varieties with hardy flowers.

Strawberry varieties that bloom late usually escape frost injury, unless they are grown in an area subject to late spring frosts. Marlate, Redstar, Sparkle, and Tennessee Beauty bloom late, after most danger of frost is past.

Varieties most likely to escape frost damage are Badgerglo, Catskill, Earlidawn, Midway, Redstar, Sparkle, Tennessee Beauty, and Trumpeter. In areas where frosts are usually severe, everbearing varieties are generally grown. If their first blossoms are killed, the plants produce a new set of flower clusters.

Temperature

Flavor is only one quality that is determined and influenced by the interplay of climatic conditions. Temperature, climate, and local weather combine to affect the

dessert quality of strawberries. Quality varies from season to season, even within the same region. Variations are dependent upon differences in temperature and the amount of sunlight.

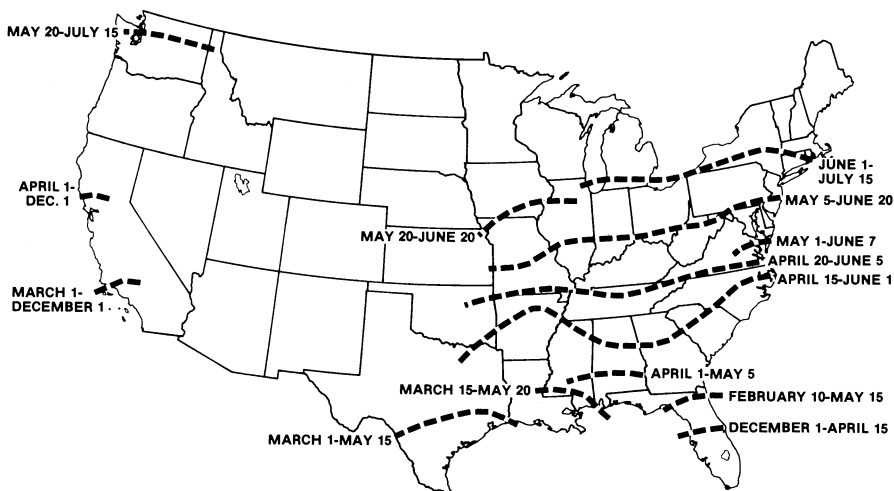
Strawberries usually have more flavor when grown in regions where days are sunny and nights are cool. Flavor is not as good when days are generally cloudy and humid, and nights are warm. Part of the difference may be explained by geography. For example, Midway has more flavor and displays better quality in Michigan and New York than in Maryland and States farther south.

Fairfax, Fletcher, Midland, and Sparkle are good dessert varieties when grown in the North. These same types, when grown in the South, are unsatisfactory. Pocahontas, Sunrise, and Surecrop are best when grown in the East Central

States. Albritton, Blakemore, Florida Ninety, and Sequoia are tastiest when grown in the South. Of varieties grown in California, Tufts has the best flavor. Hood surpasses all in Oregon and Washington.

Temperature, especially in combination with high humidity, has a pronounced effect on the firmness of fruit. Strawberries grown during cool temperatures are firmer than those that ripen during warm, humid weather.

Catskill and Sparkle varieties are firm enough for commercial use in the cool temperatures of New England, New York, and central Michigan. These same varieties, however, are too soft when produced in Maryland and States southward. Certain varieties, such as Albritton, Atlas, Blakemore, Midway, Pocahontas, Sunrise, Tennessee Beauty, and Tioga, have firm fruit wherever they are grown.



Map shows the location of the principal commercial strawberry-producing regions, the approximate ripening time in each region, and northward progression of the strawberry season.

Ripening Season

Climate, soil composition, exposure, and method of cultivation—all affect the ripening season. Weather, in particular, helps to determine the overall length of the season. Varieties that bloom early in spring ripen early. Similarly, varieties that bloom late ripen late.

High temperatures hasten ripening and shorten the interval between blossoming and the appearance of ripe fruit. Moderate temperatures of 70° to 80° F during the day and 60° to 65° during the night result in a ripening period of about 30 days. During cool weather, a variety that normally ripens early or quickly may be delayed several days.

In California, the largest strawberry acreage is near the coast where temperatures are cool as modified by the ocean. Thus, flower bud development occurs continuously, and the plants produce berries throughout summer.

In the cool, central coastal area of California, Tufts begins maturing in April and continues bearing through November. But Tufts, like many other varieties, produces only one crop when grown elsewhere. In Massachusetts, Tufts bears only one crop each year, in June.

Varieties may be selected on the basis of their ripening season:

| | |
|----------------|-----------------|
| Very early: | Guardian |
| Earlidawn | Midway |
| Midland | Raritan |
| Early: | Tioga |
| Atlas | Trumpeter |
| Blakemore | Tufts |
| Dabreak | Late midseason: |
| Earlibelle | Albritton |
| Florida Ninety | Guardian |

| | |
|------------|--------------|
| Headliner | Hood |
| Holiday | Northwest |
| Redchief | Puget Beauty |
| Redglow | Late: |
| Sequoia | Badgerlo |
| Stoplight | Jersey belle |
| Sunrise | Marlate |
| Surecrop | Olympus |
| Tangi | Sparkle |
| Midseason: | Tennessee |
| Aliso | Beauty |
| Apollo | Totem |
| Catskill | Very late: |
| Fairfax | Redstar |
| Fletcher | Vesper |
| Fresno | |

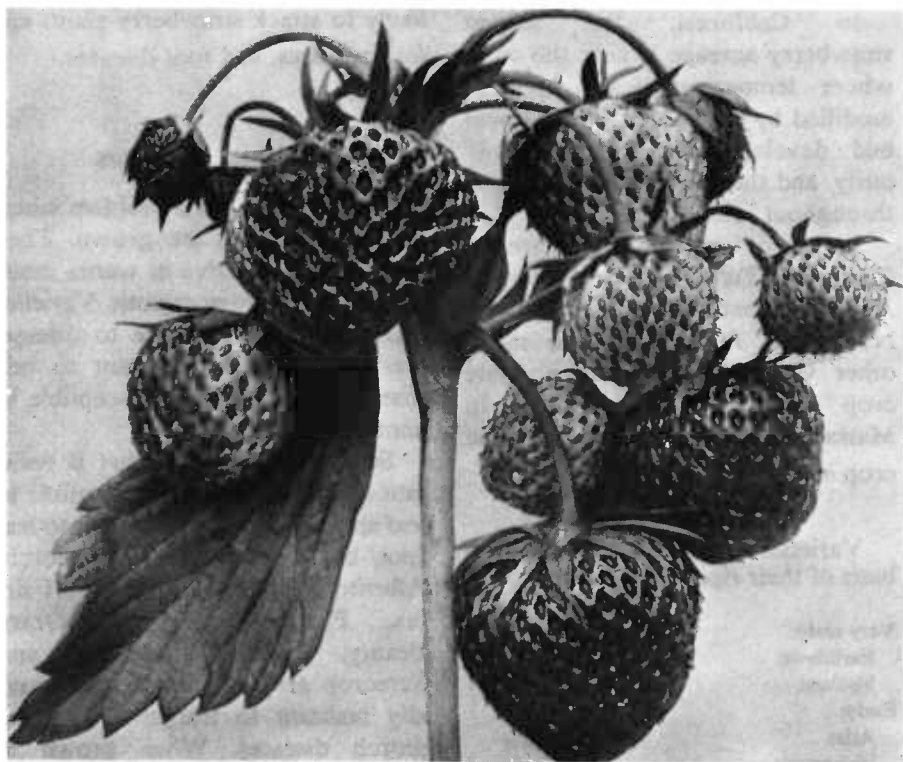
RESISTANCE TO DISEASE

The three types of diseases most likely to attack strawberry plants are foliage, virus, and root diseases.

Foliage Diseases

Leaf diseases are a problem wherever strawberries are grown. They are more destructive in warm, moist regions than in dry regions. Varieties differ in their resistance to disease. Varieties that are resistant to one disease may be highly susceptible to another disease.

Sunrise is a variety that is resistant to leaf scorch, but susceptible to leaf spot. Robinson is resistant to leaf spot, but susceptible to leaf scorch. Albritton, Dabreak, Earlibelle, Fairfax, Fletcher, Midland, Ozark Beauty, Redchief, Rockhill, and Surecrop are varieties that are usually resistant to leaf spot and leaf scorch diseases. When grown in humid areas, highly susceptible types such as Jerseybelle and Vesper are severely damaged by leaf diseases.



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Fruit clusters of two perfect-flowered varieties: Top, two flowers have set fruit and several are sterile; bottom, all flowers have set fruit.

Virus Diseases

As time goes by, most plants lose vigor and productivity. Virus diseases are responsible for much of this "running out," as the loss of vigor is called. All varieties of strawberries are susceptible to virus attack. Viruses infect the whole plant and all of its runner plants. Diseased plants do not recover.

Tolerance for virus differs from variety to variety. Sensitive varieties are weakened quickly and severely, but tolerant varieties are more durable. Some commercial nurseries carry State certified, essentially virus-free stocks of most varieties. These are usually much more productive than ordinary stocks.

Catskill, Earlidawn, Fairfax, Marshall, and Midland are particularly sensitive to virus diseases. Blakemore, Dabreak, Headliner, Northwest, Sunrise, Surecrop, Tioga, and Tufts are highly tolerant.

Root Diseases

Red stele root rot is a major disease of strawberries. Few varieties are spared. Dwarfing and sudden wilting are symptoms of this fatal fungus disease. Red stele ranges across the United States from East to West. It does not occur below 37° latitude (below a line between North Carolina and Virginia) except at higher elevations (which are cooler).

Once this disease has appeared in fields that have heavy soil or poorly drained, sandy soil, you can prevent the contamination of nearby fields by: controlling drainage water, using

uncontaminated machinery, and growing only resistant varieties of strawberries. Benton, Darrow, Delite, Earliglow, Guardian, Hood, Linn, Marshall, Midway, Olympus, Quinault, Rainier, Redchief, Redglow, Shuksan, Sparkle, Sunrise, Surecrop, and Totem—all are resistant.

Not all "resistant" varieties are resistant to all races of this fungus. But Totem and Hood in western Oregon, and Darrow, Delite, Earliglow, Guardian, Sunrise, Surecrop, and Redchief in the Eastern States are resistant to several races of the fungus.

Verticillium wilt is a soilborne fungus that infects and severely damages the roots, crowns, and leaf stems of susceptible varieties. Although most varieties are susceptible, Blakemore, Catskill, Delite, Earliglow, Guardian, and Surecrop are highly resistant.

COMMERCIAL VARIETIES

Commercial varieties of strawberries are those that have already demonstrated qualities favorable to market and processing requirements. Varieties are selected for their durability during long distance shipment for fresh market and for their adaptability to frozen pack, ice cream, and preserves.

Shipping Fresh Berries

Berries must be firm to remain wholesome during transit. When they reach the consumer, strawberries must appear fresh and appetiz-



BN-28992

Note the difference in the crowns and root system of these Blakemore and Surecrop plants. Each bundle contains 25 plants of average size.

ing. There should be no overripe, soft, moldy, or decayed berries.

In recent years, the use of air freight to ship strawberries rapidly over long distances has changed marketing practices. Now large quantities of strawberries are transported fresh from California. Varieties should be selected, in part,

according to the distance to be shipped.

When grown in regions to which they are well adapted, Albritton, Blakemore, Earlibelle, Headliner, Midway, Sunrise, Tennessee Beauty, Tioga, and Tufts are the best varieties for shipment.

Frozen Pack

In 1977, 37 percent of the total United States strawberry crop was processed by freezing. This amounted to 251 million pounds. An additional 93 million pounds of frozen strawberries were imported from abroad. A large percentage of the domestic frozen pack strawberries is grown in Oregon, Washington, and California.

Varieties best for freezing have a rich, uniform, red color. In addition, they are firm and have high flavor. The best varieties are usually Earlibelle, Earlidawn, Midland, Northwest, Pocahontas, Redchief, and Sparkle. Hood, Midway, Olympus, Tennessee Beauty, and Totem are above average for freezing.

Ice Cream and Preserves

For the ice cream trade, medium red strawberries with high (usually tart) flavor are desired. Blakemore, Hood, and Pocahontas are preferred, but several other varieties may be substituted for them.

Varieties for preserves should have berries that are medium in size, firm, and highly flavored. The berries must be uniformly colored a light bright red that will not darken after preserving.

In the East, Blakemore, Earlidawn, Pocahontas, and Sunrise are best for preserves; Albritton, Midway, and Tennessee Beauty are considered satisfactory. In the Pacific Northwest, Hood, Olympus, and Totem are rated best; Northwest is considered satisfactory.

GARDEN VARIETIES

Choose varieties for your home garden according to the region of the country in which you live. Consider the size of your garden and your intended use of the berries as well. Select only one variety for a small garden. For a larger garden, select two or more varieties, especially one early ripening and one late ripening type.

Regional Selection

In much of the South, home gardeners grow Blakemore. In western Virginia, West Virginia, Kentucky, and Tennessee, however, Tennessee Beauty is grown. In eastern Virginia, North and South Carolina, northern Georgia, Alabama, and Mississippi, Albritton is preferred. Florida Ninety, Sequoia, and Tioga are grown in Florida. Headliner is grown in southern Georgia, Alabama, Mississippi, Louisiana, and southern Texas.

In Maryland and nearby States, Fairfax, Midland, Pocahontas, Redstar, Sunrise, and Surecrop are grown for the family table. With the exception of Fairfax, all of these varieties are satisfactory for home freezing.

In New England, New York, Ohio, Michigan, and Wisconsin, Catskill, Midway, Raritan, and Sparkle are popular varieties. Cyclone and Trumpeter are considered best for the Great Plains States and for the Upper Mississippi Valley.

In the Western United States, Hood, Northwest, Shuksan, and Tioga are grown most extensively in home gardens.

Everbearing Varieties

Everbearing varieties generally are not grown commercially. They are used extensively and almost exclusively in home gardens. Everbearing varieties grow satisfactorily from northern New Jersey westward to the Great Plains States and northward.

Everbearing varieties are versatile and adaptable. They succeed at high elevation in the Appalachian Mountains as well as in irrigated regions from Colorado and Montana to northern California, Oregon, and Washington.

The foremost everbearing variety is Gem (also called Brilliant and Superfection). Fort Laramie, Geneva, Ogallala, Ozark Beauty, Red Rich, Rockhill, Quinault, Streamliner, and Twentieth Century are other everbearers that are grown less extensively. Geneva, Red Rich, and Rockhill are notable for high flavor. Ogallala and Fort Laramie are especially winter hardy.

DESCRIPTIONS

By referring to the following brief descriptions and to the table on page 16, you can select the variety that best suits your locality and purpose.

Most of the varieties described are widely grown in at least one region. Some are promising new varieties that have already been tested. Others are grown for special purposes or are dominant in special areas. All are perfect flowered.

Commercially important qualities are mentioned within each description. Immediately following each

name are place and date of origin. Where date of origin is unknown, the date of introduction is given.

Albritton

North Carolina, 1945. Berries are large, uniform, conic, and very firm. Skin is glossy and bright red; flesh is red up to center; seeds are on the surface. Excellent quality. Subacid. Late. Plants are vigorous and produce many runners. Albritton is well adapted for freezing and develops a high flavor in North Carolina. It is not productive or fully hardy in Maryland and New Jersey.

Atlas

North Carolina, 1958. Berries are large, globose conic, and have firm flesh, firm glossy skin, medium-red color flesh, medium-red surface color, and good subacid flavor. Fruit ripens in midseason. Plants of Atlas are large, vigorous, productive, and produce a moderate number of runners. Susceptible to red stele root rot. Leaves are resistant to leaf scorch, but susceptible to powdery mildew. Adapted from Virginia southward to within 100 miles of the Gulf Coast.

Blakemore

Maryland, 1923. Berries are small, blunt conic, and firm. They have bright, light-red skin and light-red flesh that will not darken during holding. Blakemore has a high acid and pectin content. Fair dessert quality. Berries are easy to hull. Early ripening. Plants are vigorous and



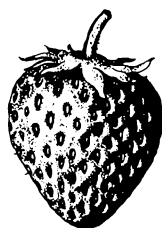
Oblate



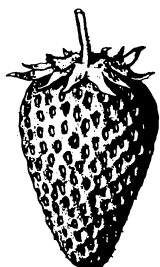
Globose



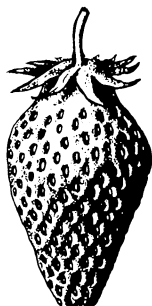
Globose Conic



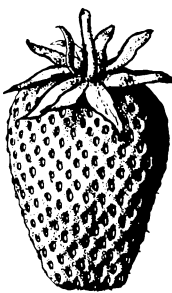
Conic



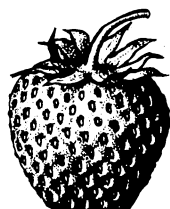
Long Conic



Necked



Long Wedge



Short Wedge

Shapes of strawberries.

produce many runners. Highly tolerant to virus diseases. Very resistant to verticillium wilt, leaf scorch, and leaf spots. Blakemore is especially desirable for preserving. A leading variety in the United States and grown over a wide range of soil types in the region from Virginia to Georgia and westward to Oklahoma and southern Missouri.

Catskill

New York, 1923. Berries are very large, long conic, irregular, and not firm. Fruit is attractive and has a bright-crimson skin and light-red flesh. Good dessert quality. Above average for freezing and mildly subacid. Produces runners freely. Plants are sensitive to virus diseases and foliage is susceptible to leaf

spots. Catskill is recommended as a midseason variety for home use and for local markets. It may be grown over a wide range of soil types from New England and New Jersey to southern Minnesota.

Dabreak

Louisiana, 1961. Berries are large and very attractive. Color is medium red. Good dessert and preserving quality and subacid. Very productive and early. Resistant to leaf spot. Now a leading variety in Louisiana.

Earlidawn

Maryland, 1947. Berries are large, conic, somewhat irregular in shape, and medium firm. Good dessert

Table 1.—Characteristics of leading strawberry varieties when grown in favorable areas

| Variety | Plant disease resistance | | | | | Fruit characteristics | | | | | |
|-------------------|--------------------------|------------------|-------------|-------------------|------------------|-------------------------------------|--------------|----------------|---------------|-----------------|---------------------------------|
| | Leaf spot | Leaf scorch | Red stele | Verticillium wilt | Virus tolerance | Ripening season: days after Midland | Size | Flesh firmness | Skin firmness | Dessert quality | Processing quality for freezing |
| Aiko ¹ | Inter-mediate | Unknown | Susceptible | Susceptible | Tolerant | 10 | Medium-large | Firm | Firm | Fair | Unknown |
| Albritton | Resistant | Very resistant | Susceptible | Susceptible | Susceptible | 12 | Large | Very firm | Firm | Excellent | Good |
| Aliso | Unknown | Unknown | Susceptible | Susceptible | Unknown | 7 | Large | Medium | Medium | Good | Good |
| Apollo | Resistant | Very resistant | Susceptible | Inter-mediate | Unknown | 7 | Large | Very firm | Firm | Good | Good |
| Atlas | Resistant | Very resistant | Susceptible | Inter-mediate | Unknown | 3 | Very large | Firm | Firm | Good | Poor |
| Badgerbelle | Resistant | Susceptible | Susceptible | Unknown | Unknown | 14 | Large | Soft | Soft | Fair | Fair |
| Badgerglo | Unknown | Susceptible | Susceptible | Susceptible | Unknown | 14 | Large | Medium | Medium | Good | Unknown |
| Benton | Unknown | Unknown | Resistant | Unknown | Tolerant | 16 | Large | Soft | Tender | Very good | Good |
| Blakemore | Susceptible | Very susceptible | Susceptible | Resistant | Tolerant | 3 | Small | Firm | Tender | Fair | Good |
| Cardinal | Resistant | Resistant | Susceptible | Susceptible | Unknown | 7 | Large | Firm | Firm | Fair | Good |
| Catskill | Susceptible | Resistant | Susceptible | Very resistant | Very susceptible | 7 | Very large | Soft | Soft | Good | Fair to good |
| Comet | Resistant | Resistant | Susceptible | Unknown | Unknown | 3 | Medium-large | Very firm | Firm | Good | Good |
| Cruz ¹ | Unknown | Unknown | Susceptible | Susceptible | Tolerant | 7 | Large | Firm | Firm | Very good | Unknown |
| Cyclone | Resistant | Unknown | Susceptible | Unknown | Tolerant | 3 | Large | Soft | Soft | Very good | Good |
| Darrow | Inter-mediate | Inter-mediate | Resistant | Inter-mediate | Unknown | 3 | Large | Firm | Firm | Good | Very good |
| Dabreak | Very resistant | Resistant | Susceptible | Susceptible | Tolerant | 0 | Medium | Medium | Medium | Good | Good |
| Delite | Resistant | Resistant | Resistant | Resistant | Unknown | 12 | Large | Medium-soft | Firm | Fair | Unknown |

| | | | | | | | | | | | |
|--------------------|------------------|------------------|-------------|----------------|--------------|----|--------------|-----------|-----------|-----------|-----------|
| Earlibelle | Very resistant | Very resistant | Susceptible | Susceptible | Tolerant | 3 | Large | Very firm | Very firm | Good | Very good |
| Earlidawn | Susceptible | Intermediate | Susceptible | Susceptible | Susceptible | 0 | Large | Medium | Medium | Fair | Very good |
| Earliglow | Resistant | Resistant | Resistant | Resistant | Unknown | 3 | Medium-large | Firm | Firm | Very good | Very good |
| EarliMiss | Resistant | Resistant | Susceptible | Unknown | Unknown | 5 | Medium-large | Medium | Medium | Good | Unknown |
| Fairfax Fletcher | Resistant | Resistant | Susceptible | Unknown | Susceptible | 7 | Medium | Firm | Soft | Excellent | Fair |
| | Resistant | Very resistant | Susceptible | Susceptible | Unknown | 7 | Medium | Medium | Soft | Very good | Good |
| Florida Belle | Unknown | Unknown | Susceptible | Unknown | Unknown | 5 | Large | Medium | Tender | Good | Unknown |
| Florida Ninety | Very susceptible | Very susceptible | Susceptible | Susceptible | Unknown | 5 | Very large | Soft | Soft | Very good | Fair |
| Fort Laramie | Intermediate | Intermediate | Susceptible | Unknown | Unknown | 7 | Medium | Medium | Medium | Good | Unknown |
| Fresno | Intermediate | Unknown | Susceptible | Susceptible | Intermediate | 7 | Very large | Firm | Firm | Fair | Fair |
| Gem Guardian | Susceptible | Resistant | Susceptible | Unknown | Unknown | 7 | Small | Soft | Soft | Fair | Fair |
| | Resistant | Resistant | Resistant | Very resistant | Unknown | 7 | Very large | Firm | Firm | Good | Fair |
| Headliner | Resistant | Unknown | Susceptible | Unknown | Unknown | 7 | Large | Medium | Medium | Good | Good |
| Heidi ¹ | Unknown | Unknown | Susceptible | Unknown | Tolerant | 7 | Large | Firm | Firm | Good | Unknown |
| Holiday | Resistant | Resistant | Susceptible | Intermediate | Unknown | 5 | Large | Very firm | Very firm | Good | Good |
| Hood | Resistant | Resistant | Resistant | Resistant | Susceptible | 10 | Large | Medium | Medium | Very good | Good |
| Jerseybelle | Very susceptible | Susceptible | Susceptible | Susceptible | Susceptible | 14 | Very large | Soft | Firm | Fair | Poor |
| Linn | Unknown | Unknown | Resistant | Unknown | Intermediate | 17 | Large | Very firm | Very firm | Fair | Good |
| Marlate | Resistant | Resistant | Susceptible | Susceptible | Unknown | 14 | Medium-large | Firm | Firm | Good | Unknown |
| Midland | Resistant | Resistant | Susceptible | Susceptible | Susceptible | 0 | Large | Firm | Soft | Excellent | Very good |

¹ Patented.

Table 1.—Characteristics of leading strawberry varieties when grown in favorable areas—Continued

| Variety | Plant disease resistance | | | | | Fruit characteristics | | | | | |
|-----------------|--------------------------|---------------|-------------|-------------------|-----------------|-------------------------------------|--------------|----------------|---------------|-----------------|---------------------------------|
| | Leaf spot | Leaf scorch | Red stele | Verticillium wilt | Virus tolerance | Ripening season: days after Midland | Size | Flesh firmness | Skin firmness | Dessert quality | Processing quality for freezing |
| Midway | Very susceptible | Susceptible | Resistant | Inter-mediate | Unknown | 10 | Large | Firm | Firm | Good | Very good |
| Northwest | Resistant | Unknown | Susceptible | Inter-mediate | Tolerant | 14 | Medium | Medium | Medium | Good | Very good |
| Ogallala | Unknown | Unknown | Susceptible | Unknown | Unknown | 7 | Medium | Soft | Soft | Good | Good |
| Olympus | Unknown | Unknown | Resistant | Unknown | Tolerant | 14 | Medium | Medium | Soft | Good | Very good |
| Ozark Beauty | Resistant | Resistant | Susceptible | Susceptible | Unknown | 14 | Medium | Medium | Medium | Very good | Good |
| Pocohontas | Resistant | Inter-mediate | Susceptible | Susceptible | Unknown | 7 | Large | Medium | Medium | Good | Very good |
| Puget Beauty | Resistant | Resistant | Susceptible | Unknown | Susceptible | 7 | Large | Medium | Soft | Very good | Good |
| Quinalt Rainier | Resistant | Resistant | Resistant | Unknown | Susceptible | 7 | Medium | Soft | Soft | Good | Fair |
| | Unknown | Unknown | Resistant | Resistant | Tolerant | 16 | Large | Medium | Medium | Very good | Excellent |
| Raritan | Susceptible | Susceptible | Susceptible | Susceptible | Unknown | 7 | Large | Firm | Medium | Fair | Fair |
| Redchief | Resistant | Resistant | Resistant | Inter-mediate | Unknown | 7 | Large | Firm | Firm | Good | Very good |
| Redcoat | Unknown | Unknown | Susceptible | Unknown | Unknown | 10 | Medium-large | Medium | Medium | Good | Unknown |
| Redglow | Susceptible | Inter-mediate | Resistant | Susceptible | Unknown | 3 | Large | Firm | Firm | Good | Very good |
| Redstar | Susceptible | Resistant | Susceptible | Inter-mediate | Tolerant | 18 | Large | Firm | Firm | Good | Good |
| Robinson | Inter-mediate | Susceptible | Susceptible | Resistant | Tolerant | 10 | Large | Soft | Soft | Fair | Poor |

| | | | | | | | | | | | |
|--------------------|-----------------------|-------------------|-------------|-------------------|-------------------|----|---------------|--------|--------|--------------|--------------|
| Rockhill | Inter- mediate | Unknown | Susceptible | Unknown | Unknown | 7 | Medium | Soft | Soft | Very good | Good |
| Salinas | Unknown | Unknown | Susceptible | Resistant | Tolerant | 0 | Large | Medium | Medium | Good | Unknown |
| Sequoia | Unknown | Unknown | Susceptible | Susceptible | Tolerant | 0 | Very large | Soft | Soft | Very good | Unknown |
| Shasta | Susceptible | Unknown | Susceptible | Susceptible | Tolerant | 7 | Large | Medium | Medium | Good | Good |
| Shuksan | Unknown | Unknown | Resistant | Resistant | Tolerant | 16 | Large | Medium | Medium | Good | Excellent |
| Sparkle | Susceptible | Inter- mediate | Resistant | Susceptible | Susceptible | 12 | Small | Soft | Soft | Very good | Very good |
| Stoplight | Inter- mediate | Inter- mediate | Susceptible | Unknown | Unknown | 7 | Medium | Soft | Medium | Good | Very good |
| | Very sus- ceptible | Resistant | Resistant | Resistant | Unknown | 0 | Large | Firm | Firm | Good | Fair |
| Surecrop | Resistant | Resistant | Resistant | Very resistant | Tolerant | 5 | Large | Firm | Medium | Good | Good |
| Tangi | Resistant | Resistant | Susceptible | Unknown | Unknown | 5 | Medium | Medium | Medium | Good | Unknown |
| Tenn. | | | | | | | | | | | |
| Beauty | Resistant | Resistant | Susceptible | Unknown | Tolerant | 12 | Small | Firm | Firm | Good | Good |
| Tioga | Susceptible | Unknown | Susceptible | Susceptible | Tolerant | 10 | Very large | Firm | Firm | Good | Good |
| Titan | Resistant | Resistant | Susceptible | Susceptible | Unknown | 3 | Large | Firm | Firm | Good | Good |
| Toro ¹ | Unknown | Unknown | Susceptible | Susceptible | Tolerant | 7 | Large | Medium | Medium | Fair | Unknown |
| Torrey | Unknown | Unknown | Susceptible | Susceptible | Inter- mediate | 14 | Large | Medium | Medium | Fair | Fair |
| Totem | Unknown | Unknown | Resistant | Unknown | Tolerant | 14 | Large | Medium | Medium | Good | Good |
| Trumpeter | Very sus- ceptible | Unknown | Susceptible | Unknown | Tolerant | 10 | Medium | Soft | Soft | Good | Very good |
| Tufts ¹ | Inter- mediate | Unknown | Susceptible | Susceptible | Tolerant | 7 | Large | Firm | Firm | Good | Unknown |

¹ Patented.

quality. Berries have bright, light-red skin, glossy surface, and bright-red flesh. Blossoms and produces fruit early. Plants are productive, but make fewer runners than most varieties do. Earlidawn is moderately resistant to leaf spots and leaf scorch. Susceptible to verticillium wilt. An early fresh market and freezing variety. Earlidawn is adapted to Maryland, north to New England, and west to Missouri.

Fairfax

Maryland, 1923. Berries are medium in size, attractive and wedge shaped to short, blunt, and conic shaped. Deep-red flesh is covered with brighter red skin. Excellent dessert quality. Mildly subacid. Medium early. Makes fewer runners than many other varieties. Plants are especially productive when late season runners are picked off. Berries turn dark if not picked and marketed promptly after they first ripen. Foliage is resistant to leaf spots and leaf scorch. Plants are sensitive to virus diseases. Fairfax is grown from southern New England to Maryland and westward to Kansas.

Fletcher

New York, 1959. Berries are medium sized, soft, conic shaped, medium red in color. Glossy, tender skin. Very good to excellent flavor. Very good for freezing. Plants are vigorous, produce runners freely. Ripens in midseason. Good home garden variety for New York and New England.

Florida Ninety

Florida, 1947. Berries are soft, irregular, and long conic. In Florida, they are very large, early in season. Color is medium red and flesh is light pink. Good to very good dessert quality. Productive. Florida Ninety grows more runner plants than any other variety. Very susceptible to leaf spots and leaf scorch. Florida Ninety is an important variety in Florida.

Fresno

California, 1955. Berries are large, long conic, firm fleshed, and attractive with a bright-red skin. Caps (calyx) are easily removed. Plants are productive with many runners. Vigorous and resistant to viruses. Recommended for summer planting only. Fresno is especially adapted to southern California, where it follows a moderately heavy spring crop with a rather heavy midsummer bearing.

Gem (Brilliant, Superfection)

Michigan, 1933. Berries are soft, small, and irregular short wedge to oblate shaped. Surface is a glossy, deep red. Center is a paler red. Good dessert quality. Acid. Gem is resistant to leaf scorch, but susceptible to leaf spots. A leading ever-bearer.

Guardian

Maryland, 1959. Berries are large, conic; primary fruits irregular, rough; later fruits smooth, firm flesh, firm, glossy skin, surface light red, flesh light-red color, good flavor. Plants have medium vigor, produce

many runners, are resistant to several races of red stele, very resistant to verticillium wilt. Leaves are resistant to scorch and powdery mildew, but moderately susceptible to leaf spot. Adapted to central east coast and westward to Missouri.

Headliner

Louisiana, 1957. Berries are large, blunt conic, medium firm, and medium red. Good dessert quality and mildly subacid. Midseason. Plants are vigorous, productive, and make runners freely. Resistant to leaf spots. Not adapted to Central or Northern States.

Holiday

New York, 1964. Berries are medium large, very firm with very firm skin, bright red, red flesh, ripen early-midseason, have good flavor, medium production. Plants are vigorous, produce runners freely, are moderately productive. Leaves are resistant to leaf spot and leaf scorch. Adapted to Northeastern United States.

Hood

Oregon, 1965. Berries are large, round conic, uniform, and medium firm. Bright, medium-red, glossy skin. Good dessert quality. Very good for preserving. Mildly subacid. Ripens in season with Northwest. Resistant to mildew and foliage diseases in the Pacific Northwest. Not as tolerant of virus diseases and as good for freezing as Northwest variety, but more resistant to red stele.

Jerseybelle

New Jersey, 1955. Berries are very large, blunt conic, and soft. Very glossy, medium red in color. Mild flavor and not adapted to freezing. Late. Large plants, with a medium number of runners. Noted for its large, showy, and attractive fruits. Very susceptible to leaf spot, leaf scorch, red stele, and verticillium wilt. Productive from southern New Jersey northward.

Marlate

Maryland, 1958. Berries are large, conic, symmetrical; have firm flesh, firm skin, bright-red color, light-red flesh, good flavor; ripen late. Plants medium size, medium vigor, productive, susceptible to red stele and verticillium wilt. Leaves resistant to leaf scorch, leaf spot, and mildew. Adapted to mid-Atlantic region.

Midland

Maryland, 1929. Berries are large, round conic, and irregular in shape. Glossy surface and deep-red flesh. Medium in firmness. Very good to excellent dessert quality. Mildly subacid. Ripens very early. Freezes very well. Plants are productive, but make fewer runners than most other varieties. Midland yields well when irrigated and grown in fertile soil or in the hill system. Resistant to leaf spots and leaf scorch in general. Sensitive to virus diseases. Midland is popular from southern New England to Virginia and west to Iowa and Kansas.

Midway

Maryland, 1951. Berries are long conic, with firm flesh and a firm surface. Medium to large in size. Glossy, rich red in color. Midseason. Good dessert quality. Subacid. Very good for freezing. Plants produce runners freely. Resistant to some races of red stele. Susceptible to leaf spots, leaf scorch, and verticillium wilt. Not as resistant to drought as some varieties. The leading variety in Michigan. Very productive in all the Northeastern States south to Maryland.

Northwest

Washington, 1941. Berries are medium in size, uniform, and are long, blunt conic. Medium in firmness, bright crimson, glossy surface. Red flesh. Very good dessert quality and subacid. Very good for freezing. Late ripening. Plants are tolerant to virus diseases, but susceptible to leaf spots. Northwest ripens about 1 week after Marshall and has largely replaced it in Washington and Oregon.

Ogallala

Nebraska, 1956. Berries are soft, medium in size, and dark red. Sweet, good flavor and good for freezing. Berries ripen early. Plants are vigorous, hardy during winter. Resistant to leaf spot and resistant to drought. Ogallala is an everbearing variety grown from the Mississippi River west through the Rocky Mountain States.

Olympus

Washington, 1962. Berries medium in size, uniform, round, very easy capping; medium-firm flesh;

tender skin; bright-red external and internal color. Subacid and very good for freezing. Tolerant of virus diseases and resistant to some races of red stele. Plants are very productive because of many branched crowns. Low runner production.

Ozark Beauty

Arkansas, 1955 (Introduced). Berries are large, sweet, and good flavored. An everbearing variety. Color and flesh is bright red. Productive on mother plants, not on runner plants, during summer and fall. Plants may have variegation or June yellows, which weakens them.

Pocahontas

Maryland, 1946. Berries are large, attractive, and blunt conic. Medium in firmness. Bright, medium-red skin and red flesh. Ripens early. Good dessert quality and subacid. Very good for freezing. Plants are vigorous and produce runners freely. Foliage is generally resistant to leaf scorch and partially resistant to leaf spot in the South. Pocahontas is a productive variety for the northern Blakemore area. It may be grown from southern New England south to Norfolk, Virginia, and west to Missouri.

Quinault

Washington, 1967. Berries are large to very large and round to round conic. Soft. Attractive bright red in color. Good dessert quality, but not good for frozen products. Susceptible to mildew. Quinault is an everbearing type for home gardens in the Western States.

Raritan

New Jersey, 1968. Berries are large, firm, and glossy. Bright red with a good flavor. Plants are medium sized and very productive. Moderate number of runners. Plants are susceptible to red stele and verticillium wilt. Not so drought resistant as some varieties. Raritan ripens in midseason. Replaces Jerseybelle in some areas.

Redchief

Maryland, 1959. Berries are firm, medium sized, and conic in shape. Skin is glossy and medium red. Flesh is deep red. Good flavor and very good for freezing. Ripens early. Caps easily removed. Plants are medium in vigor, produce runners freely. Resistant to red stele and verticillium wilt. Leaves are resistant to leaf scorch and mildew. Somewhat susceptible to leaf spot.

Redstar

Maryland, 1931. Berries are large, irregular, and blunt conic. Firmness is medium. Color is medium red. Ripens very late. Good to very good dessert quality and subacid. Plants are tolerant to virus diseases and make runners freely. Leaves are large and resistant to leaf spots and leaf scorch. Redstar is one of the better late varieties. Grown from southern New England south to Maryland and west to Missouri and Iowa.

Rockhill (Wazata)

Iowa, 1918. Berries are irregular and round conic to short wedge.

Medium in firmness. Bright-red skin and light-red flesh. Everbearing. Excellent quality and subacid. Plants produce few runners and may be propagated by crown division. Foliage is dark green and healthy. Excellent flavor, large size, and attractive appearance make Rockhill highly desirable. Grown in Minnesota, Iowa, Oregon, and other Northern States.

Sparkle (Paymaster)

New Jersey, 1931. Berries are short blunt conic to oblate. Medium sized but sometimes small. Soft and glossy, rich red. Mildly subacid. Very good dessert quality. Very good for freezing. Plants produce runners freely. Resistant to some races of red stele and partially resistant to leaf spots. Susceptible to virus diseases. Sparkle is a productive, late variety. Grown in the Northeastern States west to Wisconsin.

Stoplight

Iowa, 1963. Berries are broad conic, medium sized; have bright-red skin, red flesh, medium firmness, very good flavor. Ripens midseason. Plants are vigorous, produce many runners, very productive. Leaves have some resistance to leaf spot and leaf scorch. Adapted to North Central and Plains regions.

Sunrise

Maryland, 1964. Berries are medium sized and conic. Very symmetrical and firm. Glossy, firm skin. Light red and does not darken at

maturity. Very good flavor. Flesh too pale for freezing. Sunrise ripens early. Plants are vigorous and produce runners freely. Resistant to several races of red stele and moderately resistant to verticillium wilt. Leaves resistant to leaf scorch and mildew; but susceptible to leaf spot. Sunrise is productive in South Central States, not productive in Northern States.

Surecrop

Maryland, 1950. Berries are large, round conic, and irregular. Glossy surface and firm. Medium-red exterior and light-red interior. Ripens early. Good dessert quality, subacid. Plants are large and produce many runners. Productive when spaced 6 to 9 inches apart. Resistant to several races of red stele, to verticillium wilt, leaf spots, leaf scorch, and drought.

Tangi

Louisiana, 1963. Berries are medium large, moderately firm flesh, medium-red surface color, red flesh, and good flavor. Plants are resistant to leaf spot and leaf scorch, but susceptible to anthracnose and powdery mildew. Adapted to Gulf Coast region.

Tennessee Beauty

Tennessee, 1933. Berries are attractive, uniform, and long conic. Medium sized. Color is a glossy, medium to deep red. Good dessert quality and mildly subacid. Large

caps. Good freezing quality. Late midseason. Plants produce runners freely. Resistant to leaf spots and leaf scorch. Tolerant to virus diseases. Less drought resistant than other varieties. Because of its flavor, firmness, color and productivity, Tennessee Beauty is a leading variety from Kentucky to Missouri.

Tioga

California, 1955. Berries are large sized and long conic. Firm flesh and tough skin. Red- to light-red flesh and yellow seeds. Attractive, light-red skin. Good appearance even when overripe. Good dessert quality. Caps easily. Ships well to distant markets. Plants are vigorous and produce runners freely. Susceptible to leaf spot. Tioga is the leading variety in California. Recommended for summer and winter planting. In California, plants produce an exceptionally heavy crop for over 2 months beginning in March or April. Grown also in Florida.

Totem

British Columbia, 1962. Berries are medium to large, uniform, conic, very similar to Northwest. Firm on stiff, upright scapes, with bright red glossy surface and good red interior color. Easier capping than Northwest; good dessert quality and subacid. Very good for freezing. Tolerant to virus diseases and more winter hardy than Northwest. Plants vigorous and produce runners very well. Some fruit rot resistance and resistant to mildew and red stele.

Trumpeter

Minnesota, 1960. Berries are medium sized and short conic. Soft and glossy. Very good flavor. Good for freezing. Plants are vigorous and produce runners freely. Ripens late. Winter hardy and productive, but susceptible to leaf spot. Home garden and pick-your-own variety for Upper Mississippi Valley and Plains States.

NEW VARIETIES UNDER TEST

Several new varieties that are being tested extensively by growers have been introduced recently. Their general acceptance and regional adaptation for commercial use are still to be determined. Their specific characteristics known so far are given in table 1. A brief description including place of origin follows (place of origin usually indicates regional adaptation of a variety):

Aiko - California - patented. Very productive in central California; ripens too late for southern California. Plants bear uniformly throughout long season.

Badgerglo - Wisconsin. Ripens late; very productive; not so winter hardy as Badgerbelle.

Benton - Oregon. Disease resistant; very good flavor; home garden and pick-your-own type.

Cardinal - Arkansas. Very firm, large, tough skin; concentrated ripening for possible machine harvesting.

Comet - Arkansas. Very firm; productive; glossy surface; more flavorful than Cardinal.

Cruz - California - patented. Best for winter plantings in central coastal California. Large, very good dessert quality of berries.

Darrow - Maryland. Ripens very early. Disease-resistant plants that are productive. Primary fruits are frequently rough.

Delite - Illinois. Ripens late-midseason, large fruit. Plants are disease resistant, productive, and produce many runners.

Earliglow - Maryland. Ripens very early, very good flavor, some resistance to fruit rot. Plants are disease resistant; produce abundant runners on fertile soil that require thinning for highest production.

Earlimiss - Mississippi. Ripens early. Plants very productive, drought tolerant, vigorous, and resistant to foliage diseases.

Florida Belle - Florida. Berries are large, ripen in midseason, and have medium firm flesh. Plants are resistant to some races of anthracnose.

Fort Laramie - Wyoming. Plants are everbearers and very winter hardy. Fruit is medium sized and of good quality. Leaves are very susceptible to mildew.

Linn - Oregon. Fruit is large, firm, ripens late. Has concentrated ripening for machine harvesting; fruit exposed for ease of harvesting.

Titan - North Carolina. Fruit ripens early, very large, good quality. Plants are vigorous, productive; leaves are resistant to diseases.

Toro - California - patented. Fruit ripens early and are large, moderately firm, high in ascorbic acid. Plants are vigorous, best in

winter plantings, not prolific runner producers.

Tufts - California - patented. Fruit is large, firm, long, flat conic; skin tough; bright red; flesh firm; han-

dles well. Ripens earlier than Tioga. Plants less susceptible to leaf spot than Tioga; low chilling; vigorous; productive; susceptible to verticillium wilt.

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